WHAT IS CLAIMED IS:

1. A method for verifying the transfer of a fluid from a first composition to a second composition comprising:

providing a first composition having a first fluid therein;

providing a second composition having a second fluid therein, wherein said second composition includes a predetermined amount of luminescent semiconductor nanocrystals capable of emitting electromagnetic radiation in a narrow wavelength band when excited;

transferring all or a portion of said second composition into said first composition to form a third composition;

exposing said third composition to energy capable of exciting said luminescent semiconductor nanocrystals; and

detecting the electromagnetic radiation emitted from said luminescent semiconductor nanocrystals in said third composition.

2. The method according to claim 1, further comprising quantifying the luminescent semiconductor nanocrystals in said third composition to verify the delivered amount of said second composition into said first composition to form said third composition.

3. The method according to claim 1, wherein said semiconductor nanocrystal is a core/shell nanocrystal.

4. The method according to claim 1, wherein said semiconductor nanocrystal has a diameter between about 2 nm and about 50 nm.

5. The method according to claim 4, wherein said semiconductor nanocrystal has a diameter between about 2 nm and about 20 nm.

6. The method according to claim 1, wherein said semiconductor nanocrystal is selected from the group consisting of ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, and mixtures thereof.

7. The method according to claim 3, wherein said semiconductor nanocrystal has a core which comprises CdSe.

8. The method according to claim 7, wherein said semiconductor nanocrystal has a shell which comprises CdS.

9. The method according to claim 7, wherein said semiconductor nanocrystal has a shell which comprises ZnS.

10. The method according to claim 1, wherein said semiconductor nanocrystals are monodisperse.

11. The method according to claim 3, wherein said semiconductor nanocrystal has a core diameter between about 2 nm and about 50 nm.

12. The method according to claim 3, wherein said semiconductor nanocrystal has a core diameter betweem about 2 nm and about 6 nm.

13. The method according to claim 11, wherein said semiconductor nanocrystal includes a shell having a thickness of about 2 nm.

14. The method according to claim 12, wherein said semiconductor nanocrystal includes a shell having a thickness of about 2 nm.

15. The method according to claim 1, wherein said method further comprises that said semiconductor nanocrystal is linked to a target present in said second fluid.

16. The method according to claim 1, wherein said method further comprising the step of nucleic acid testing.

17. The method according to claim 1, wherein the luminescent semiconductor nanocrystals are present in an amount from about 0.0002 nanomolar to about 20 nanomolar.

18. A method for monitoring the flow of a reagent comprising:

providing a composition being admixed with a predetermined amount of luminescent semiconductor nanocrystals capable of emitting electromagnetic radiation in a narrow wavelength band when excited;

transferring all or a portion of said composition to a container;

exposing said container to energy capable of exciting said luminescent semiconductor nanocrystals; and

detecting the electromagnetic radiation emitted from said luminescent semiconductor nanocrystals.

19. The method according to claim 18, further comprising quantifying the luminescent semiconductor nanocrystals in said container to verify the delivery quantity of said composition.

20. The method according to claim 18, wherein the luminescent semiconductor nanocrystals are present in an amount from about 0.0002 nanomolar to about 20 nanomolar.

21. The method according to claim 18, wherein said container is a reaction vessel.

22. A method for monitoring the flow of a composition comprising:

providing a composition admixed with a predetermined amount of luminescent semiconductor nanocrystals capable of emitting electromagnetic radiation in a narrow wavelength band when excited;

transferring all or a portion of said composition to a container;

obtaining a unit sample from said container;

exposing said sample to energy capable of exciting said luminescent semiconductor nanocrystals;

detecting the electromagnetic radiation emitted from said luminescent semiconductor nanocrystals in said sample to verify the delivery of said composition.

23. The method according to claim 22, wherein said composition is a reagent.

24. The method according to claim 22, further comprising quantifying the luminescent semiconductor nanocrystals in said sample to verify the amount of composition delivered to said container.

25. The method according to claim 22, wherein the luminescent semiconductor nanocrystals are present in an amount from about 0.0002 nanomolar to about 20 nanomolar.

26. A method for verifying the transfer of a plurality of fluids to a container, comprising:

providing a plurality of compositions having fluid therein wherein each member of said plurality of compositions includes a predetermined amount of different luminescent semiconductor nanocrystals capable of emitting electromagnetic radiation at different wavelength bands corresponding to said luminescent semiconductor nanocrystals when excited;

transferring all or a portion of said plurality of fluids into said container;

exposing said container to energy capable of exciting said luminescent semiconductor nanocrystals; and

detecting the electromagnetic radiation emitted from said plurality of luminescent semiconductor nanocrystals to determine the transfer of said plurality of fluids.

27. The method according to claim 26, further comprising quantifying the luminescent semiconductor nanocrystals to verify the delivery amount of said plurality of compositions into said container.

28. The method according to claim 26, wherein said plurality of compositions is transferred into said container in a batchwise transfer.

29. The method according to claim 26, wherein said plurality of compositions is transferred into said container in a sequential transfer.

30. The method according to claim 26, wherein said plurality of fluids are selected from the group consisting of reagents, buffers, solvents, and the like.

31. A method for preparing a dilute solution, comprising:

providing a first solution having a predetermined concentration of luminescent semiconductor nanocrystals capable of emitting electromagnetic radiation in a narrow wavelength band when excited;

diluting said first solution with a second solution to a predetermined dilution ratio; and

verifying said predetermined dilution ratio by exposing said diluted solution to energy capable of exciting said luminescent semiconductor nanocrystals and detecting the electromagnetic radiation emitted from said plurality of luminescent semiconductor nanocrystals to verify the predetermined dilution ratio.

32. A method for determining the cleanliness of a reaction vessel, comprising:

providing a reaction vessel having a plurality of components therein;

adding to said reaction vessel luminescent semiconductor nanocrystals capable of emitting electromagnetic radiation in a narrow wavelength band when excited;

removing the contents from said reaction vessel upon completion of the reaction;

cleaning said reaction vessel;

exposing said reaction vessel to energy capable of exciting said luminescent semiconductor nanocrystals and detecting the electromagnetic radiation emitted from said plurality of luminescent semiconductor nanocrystals; and

determining the presence or absence of said luminescent semiconductor nanocrystals remaining in said reaction vessel.

33. The method according to claim 32, wherein said reaction vessel is a bioreactor.

34. The method according to claim 32, wherein said reaction vessel is a fermentor.

35. The method according to claim 32, further comprising iterative cleaning of said reaction vessel until the quantity of said luminescent semiconductor crystals is below a predetermined level.

36. The method according to claim 32, wherein the luminescent semiconductor nanocrystals are originally present in an amount from about 0.0002 nanomolar to about 20 nanomolar.